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# SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE



APRIL 27, 1935

Man's Lightning Strikes  
See Page 269

SCIENCE SERVICE PUBLICATION

## SCIENCE NEWS LETTER

VOL. XXVII



No. 733

The Weekly Summary of  
Current Science

Published Every Saturday by

## SCIENCE SERVICE

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## DO YOU KNOW?

Ages of fish and molluscs can be learned from traces left by seasonal growth; but crabs shed their hard parts which would give this evidence, making it difficult for scientists to study their age and rate of growth.

Several fragments of sixth century B.C. pottery discovered at ruins of Lachish, Palestine, bear the name of Jahve, spelled as Jehovah in the English translations of the Bible.

Bergamot oil equals carbolic acid in its destructive action upon tubercle bacilli, and a new disinfectant is being manufactured as a result of this discovery.

Abnormally developing wisdom teeth may be recognized in children as young as nine to eleven years old, says a British physician.

Scientists are planning an international congress in Italy this summer, to discuss the ancient Etruscans.

Colorado probably has as many as a thousand kinds of wild bees.

Improvement in public milk supplies, more than any other one factor, has been responsible for the enormous saving in infant life in the past 20 years, says a New York State health official.

Forty-two Chinese bronze mirrors, mostly from the third century B. C., have been given to the Fogg Art Museum as material for chemical study of the bronze and patina.

Experiments in flax growing indicate that California can produce two to three times as high a yield as is obtained in other flax-growing regions of the United States.

The death rate of young Indian children is nearly twice that of the children of the general population in the United States.

A camp kettle used by the Romans was recently dug out of a river bed at York, England.

In medical botany a "simple" is a remedy made of a single plant.

## WITH THE SCIENCES THIS WEEK

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Does a small head necessarily mean little wit? p. 268.



## PHYSIOLOGY

# Scientist Discovers Way To Predict Your Life Span

## Age At Which Hardening Lens of Eyes Makes Difficult Accommodation For Reading Betrays Normal Lifetime

ONE of the dreams of science, discovery of a way to predict how long an individual will live—if not claimed by murder or other untimely death—was announced to the National Academy of Sciences.

A key to an individual's normal span of life, long or short, is carried with him, heretofore unrecognized, in his own eye, Dr. Felix Bernstein of Columbia University revealed.

The aging process of the human body, he reported, can be measured easily by taking note of the change when the lens of the eye becomes less elastic, some time during middle life. Most persons become aware of the change at the age of 45 or 50, when the hardening lens can no longer make sufficient accommodation for reading. If this aging process, called presbyopia or "old-sightedness," occurs early, the individual's normal span of life is comparatively short. If it occurs late in middle age, the individual can expect to see a venerable old age, unless some infection or accident cuts short his natural lifetime.

Dr. Bernstein told how he has reached his conclusions after systematic investigation of this means of measuring the aging process, carried on both in Germany and this country.

### 5,000 Cases

"Data on 5,000 cases of presbyopia," he said, "gathered from the University clinics of Goettingen and Leipzig by two students from my Institute in Goettingen and from two private oculists, and followed individually from the first tests until death, proved that presbyopia is correlated with the duration of life in such a way that the early presbyopes die early and the late presbyopes die late."

Brainstroke and heartstroke were the causes of death in the persons who proved the significance of the eye change. These accounted for about half the 5,000. The rest of the patients died of cancer, pneumonia, or other diseases, and for these the research workers could find little or

no correlation between the time the eye lens hardened and duration of life.

Reporting a further experiment under a grant from the Rockefeller Foundation given to the Biological Laboratory at Cold Spring Harbor, N. Y., Dr. Bernstein concluded:

"This shows conclusively that the physiological aging measured by the range of accommodation is strictly hereditary. Our former conclusion that the natural length of life may become predictable if a proper measure of the physiological aging has become available, is strongly backed by these findings."

Stressing the significance of the discovery for heredity, Dr. Bernstein said:

"These implications of natural span of life are especially important in regard to the fact that the natural causes of death come more in the foreground the more the infectious diseases are brought under

control. The span of life in the future will be determined much more by that which Francis Galton called 'the treasure of inheritance' than by conditions which lie in the environment."

*Science News Letter, April 27, 1935*

## MEDICINE

## Rheumatism Benefited By Big Vitamin D Doses

RICKETS-preventing vitamin D is of great benefit in the treatment of arthritis or rheumatism, as it is sometimes called, Dr. C. I. Reed of the University of Illinois College of Medicine told members of the American Physiological Society.

Seventy out of one hundred arthritis patients treated this way by himself and associates, Drs. M. L. Hathaway and H. C. Struck, were definitely helped and some apparently cured.

The vitamin was given in the form of concentrated viosterol and enormous doses were used. While three thousand units is the standard dose for rickets treatment, Dr. Reed used one million units and in some cases three million to treat the arthritis patients. All kinds of arthritis except that due to gonorrhea were helped.



### HOW LONGEVITY IS PREDICTED FROM THE EYES

With this simple apparatus, Dr. Felix Bernstein (center) of Columbia University has discovered how to tell whether a person is likely to live long or not. Miss Daisy Kinstein (left) is adjusting the instrument which tests the accommodation of the eyes for seeing near and far objects. Miss Kinstein and E. A. Roure (right) are assistants to Dr. Bernstein.

The use of vitamin D for arthritis came about accidentally. Dr. Reed had been using large doses of the vitamin to treat hay fever and asthma patients in accordance with a theory that deficiency of calcium or lime is a factor in these ailments. Vitamin D helps the body to get the full benefit of the lime in the food. One of the hay fever patients, who had suffered from arthritis for 23 years, told Dr. Reed that since getting the vitamin D for her hay fever, her arthritis had improved. She had less pain and the

swelling in her finger joints had gone down so that for the first time in several years she was able to take her wedding ring off. Dr. Reed himself had been an arthritis sufferer for some years so he took large doses of vitamin D, as much as three million units, and found his own arthritis was soon cured. Since then he has been using it regularly for arthritis patients. It seems to help them though as yet Dr. Reed has no explanation for how it works.

*Science News Letter, April 27, 1935*

#### PHYSIOLOGY

## Finds New Sensory Cells at Root of Nerves From Face

**H**ITHERTO unknown nerve cells, probably of the kind that convey sensations, have been discovered by Dr. Gustavus A. Peters of the Indiana University School of Medicine.

They are located in the roots of the trigeminal nerve that conveys sensation from the face to the brain. It is this nerve that is affected in tic douloureux, a form of trigeminal neuralgia, in which the patient suffers attacks of excruciating pain.

Dr. Peters reported his discovery at the meeting of the American Association of Anatomists. The presence of these newly-found cells, he believes, explains why sensation and pain sometimes return after operation for the relief of tic douloureux.

Alcohol injected into the nerve may

give relief from the pain in this disease temporarily. Surgical operation in which the nerve is severed gives complete relief of the pain and usually results in loss of sensation on that side of the face.

In some cases return of sensation on the operated side has been reported. Dr. Peters believes these hitherto unknown nerve cells at the root of the trigeminal nerve provide the explanation. If these cells lie next to the part of the nerve cut by the surgeon, they may cause the cut ends of the nerve to grow together again and provide a pathway for sensation once more.

Dr. Peters found these nerve cells in the central roots of the facial nerve in dogs, cats, rabbits, guinea pigs, oxen, pigs and humans.

*Science News Letter, April 27, 1935*

#### PSYCHOLOGY

## "Pinheaded" Boy Has Normal Intelligence

**A** NINE-year-old boy whose head is smaller than that of a normal baby a year old, but whose intelligence is not deficient, was reported to scientists gathered in Princeton, N. J. for the meeting of the New York Branch of the American Psychological Association by Dr. Wilbert S. Ray of the New Jersey State Hospital.

The child, whose name is withheld by his physician to spare him embarrassment, is not a midget. He is small for his

age, however, his height and weight being about average for a six-year-old. His head is only four and three-quarters inches wide and less than six inches long, (12.1 by 14.9 centimeters) about the size of your breakfast grapefruit. The circumference of his head is less than 17 inches, which has been considered average for a four-months-old infant.

This "pinheaded" boy with normal intelligence must have scant room for his brain, for the cubic capacity of his head

is only 886.9 cubic centimeters, although 945 cubic centimeters is considered average for infants on their first birthday.

Despite difficult home conditions, this boy is not feeble-minded. Although slightly behind his age in intelligence, he is doing well in school and is picking up in mental age as he grows older.

His father is dead, and his mother is feeble-minded. The mother's head is small, but not extremely so as is the boy's. Of eleven brothers and sisters, six are dead. One is in a reformatory, another is a delinquent, but the other three are average citizens of the community with inferior but not sub-normal intelligence.

*Science News Letter, April 27, 1935*

#### MEDICINE

## Rabbits Help to Test Draughts as Cause of Colds

**F**IRST steps in an investigation of whether being chilled lowers a person's resistance to such ailments as colds and pneumonia were reported by Dr. Arthur Locke of the West Penn Hospital, Pittsburgh, to the American Association of Immunologists.

The length of time it takes a rabbit to warm up after being thoroughly chilled is an index to one of the animals' four defenses against the invasion of pneumonia germs, Dr. Locke found. He stated that no human application can yet be made of his work but that the research was undertaken to get information on the effect of chilling and exposure on human resistance to disease. When it is finished it may give scientific backing to the old idea that sitting in a draught will bring on a cold.

Rabbits that took longer than 41 minutes to warm up after an icy bath that reduced their temperature to 96 degrees Fahrenheit could not resist pneumonia germs introduced into their bodies. Neither could they survive the attack of pneumonia that followed. The warming time, as Dr. Locke calls it, not only indicates the animal's resistance to invasion by these germs but also tells whether it will be able to withstand the disease.

The warming time is an index of only one of the animal's means of defending itself against infection, Dr. Locke said. He sees resistance to disease as being four-fold.

The first line of defense is the mechanical barrier of healthy, whole skin and mucous membranes. The second defense



is made by immune factors in the tissues of the body. The third line of defense is held by immune factors in the blood. All of these are important in resisting infection, and the fourth factor, which Dr. Locke calls the metabolic defense, is only an emergency defense which carries the animal along until the other defensive forces can be mobilized. It is this

emergency defense which can be determined by measuring the warming time.

The warming time is impaired by excessive loss of blood, infection, prolonged starvation, morphine poisoning, being kept in too warm an environment and by other influences which impair vitality.

*Science News Letter, April 27, 1935*

## SEISMOLOGY

## Formosa's Tragic Earthquake Recorded by Seismographs

Four Heavy Shocks Wrote Their Stories on Instruments in U. S. on Thursday, Friday, Saturday

**F**ORMOSA'S tragic earthquake, heralded through the press on Easter Sunday, tried to tell the world about itself for three days before it finally succeeded in getting a hearing.

Seismograph records, reported to Science Service through a cooperative arrangement with the U. S. Coast and Geodetic Survey and the Jesuit Seismological Association, show that there were four heavy shocks, one each on Thursday and Friday and two on Saturday. The records indicated severe earthquakes at a long distance, but were not clear enough to permit an exact location of the epicenter, which is frequently possible by these means before cabled or wireless news can come through.

The first intimation came late on Thursday, April 18, when observers at St. Louis University and the Pennsylvania State College wired that an earthquake had occurred at a little after five o'clock in the afternoon, eastern standard time.

On the following day, seven stations reported another quake in about the same place, this time at ten in the morning, eastern standard time. The reporting stations included two of the previous day, together with those of the Dominion Observatory, Ottawa; Georgetown University, Washington, D. C.; the private observatory of Mrs. M. M. Seeburger at Des Moines, Iowa; and the U. S. Coast and Geodetic Survey stations at Chicago and Honolulu.

Saturday, April 20, was not more than a few minutes old when the instruments again did their dance of death, and again at about five in the morning of the same day another shock was recorded. The Saturday quakes were reported by seismo-

logists at the University of Michigan, Ann Arbor; the Philippine Observatory, Manila, and the U. S. Coast and Geodetic Survey station at Tucson, Arizona, and Honolulu.

Delay in getting out direct wire or radio reports from Formosa is ascribed to the disruption of all communication facilities. It was stated on Monday that the Japanese authorities were still using carrier pigeons.

*Science News Letter, April 27, 1935*

## PHYSICS

## Hope of "Cold Light" Called Romantic Delusion

**"C**OLD LIGHT" like that of fireflies and shining sea-creatures is a delusion, so far as hopes of producing similar illumination cheaply by human agency is concerned. Experiments at the laboratories of the General Electric Company produced "cold light" with entire success by means of chemical mixtures—but the cost was 25 million times as great as that for the same amount of light produced by the most economical new illuminating unit, the sodium vapor lamp.

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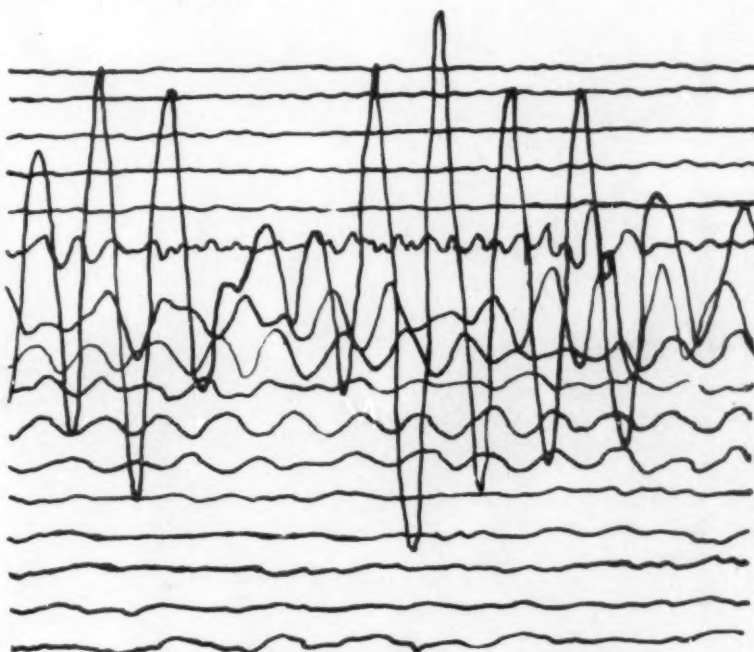
## PHYSICS

## Artificial Lightning Makes Electrical Fountain

See Front Cover

**W**HITE hot is the shower of metal particles shown on the front cover of this week's SCIENCE NEWS LETTER. It was caused by an artificial lightning bolt striking a resistance wire. The photograph was made at the General Electric Company's high-voltage laboratory at Pittsfield, Mass.

*Science News Letter, April 27, 1935*



### AN EARTHQUAKE "COVERS" ITS OWN NEWS

*How the record of one of the terrible shocks that devastated Formosa looked in its own "handwriting" on a Georgetown University seismograph. The sudden change from little "wiggles" in the line to big ones (near upper right corner of record) indicates the moment when the other side of the earth began to heave and shake, bringing death and terror to thousands of bewildered Orientals.*

ENTOMOLOGY

# Tiny Chinch Bug Threatens War On Wide Front in U. S.

**Solidly Entrenched in the Grain Area, Enemy May Do Immense Damage Unless Weather Comes to Rescue**

**W**AR on a wide front, a major campaign by hordes of man's swarming insect enemies, menaces the great central bread-producing area of the country during the coming summer.

This time the attacker is the chinch bug, a tiny, gnat-sized insect with glistening white wings.

Seasoned campaigners of the U. S. Department of Agriculture, veterans of many battles against winged foes, are girding for the conflict. They have \$2,500,000—the price of a few hour's barrage by modern artillery—for the season's fight, and with it they expect to accomplish a good deal in the way of defense; but they are really hoping for a favoring "break" from the weather if the campaign is to be decisive this year.

The chinch bug's kingdom has been extended into an empire by favor of the weather during the past two or three hot, dry summers in the great grain area of this country. Normally, chinch bugs are troublesome in the Kansas-Oklahoma-Missouri region, and not very far outside it. Their farthest northeast outpost for years has been the southwestern corner of Iowa; in the central part of that state only veteran farmers had ever seen a live one—and that was forty years ago. But now their farthest north is near Minneapolis, and their farthest east is the upper Ohio Valley.

## Drought Favored Spread

Last summer's drought was especially favorable to their spread, so that the center of heaviest infestation is now also the center of the grain belt. They have been overwintering safely in the wild grasses of the roadsides and fencerows.

Now they are beginning to move into the fields of young wheat, oats and other small grains. There the overwintering generation of females will lay their eggs, and then die. The young of the new generation will feed in swarms, severely damaging the crop—in some places probably will make it too poor to be worth harvesting.

All this time they will still be in the

immature stage, without wings. When the harvesting of small grains begins, or if a new drought makes their food scarce, they begin to crawl toward the adjacent fields of corn and other succulent forage crops. Like a living carpet, every stitch of it a ravenous little appetite, they cover the ground. The very soil seems to be moving.

Such a wave of chinch bugs will ruin a cornfield like fire, while you watch. The insects do not chew, like locusts; they drive in their tiny sharp beaks and suck the juice. And the corn wilts to ruin before your eyes.

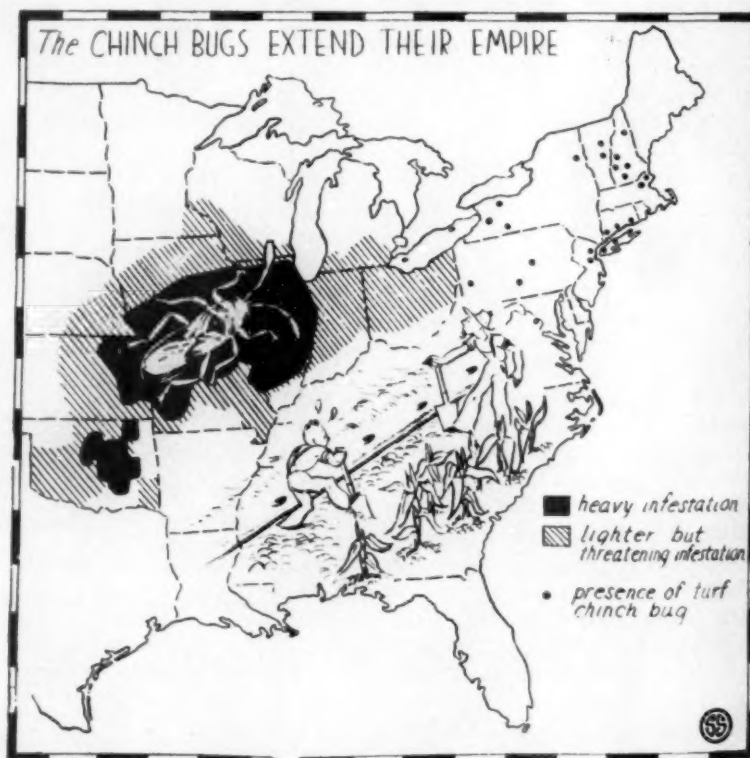
It is during this crawling stage that they are most exposed to destruction. If a week or ten days of wet, cool weather comes in late spring, their menace is reduced to a fraction. The ones still in the small-grain fields will not leave; the ones that have committed themselves to

the overland crawl are beaten into the dirt by the rain and so perish. Also, during wet weather they are exposed to a destructive fungus disease that wipes them out in billions.

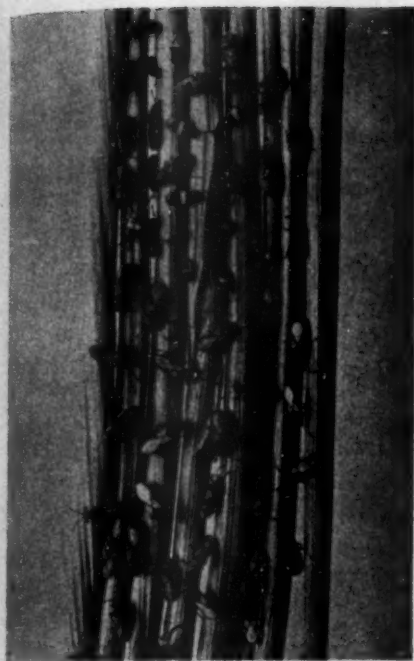
If wet weather does not favor the embattled farmer and his ally, the fighting scientist, trench warfare must be resorted to. Around the cornfield they dig a trench a foot or so deep, throwing the dirt into a rounded ridge on the cornward side. They drag a log along the bottom of the trench, to make it as dusty as possible. This puts in the path of the advancing bugs a veritable artificial mountain ridge, very difficult for them to climb.

To complete the defenses, the farmer then lays along the ridge a strip of malodorous creosote, very repellant to the chinch bugs. At intervals, branch strips lead back toward the bottom of the trench. Each of these branch strips points at a post-hole some 15 or 18 inches deep. Into these pits the swarming insects fall—and the farmer comes along with fire or chemicals or other means of destruction and massacres them.

Such chinch bugs as manage to survive the battle and get into the corn feed and breed there, producing a second generation of insects. By now it is late summer or autumn, and this second brood flies again into the roadside and fieldside grasses, there to take up winter quarters.







Cornelia Clarke Photo

#### THE CHINCH BUG UNMASKED

Enlarged up from their natural pinhead size, chinch bugs show the markings of their tribe: the white-winged individuals are adults, the wingless ones are immature specimens.

Here again they can be attacked, by burning the grasses during December, January and February.

The individual chinch bug is a very small insect, no bigger than a gnat. Under a moderately strong lens, the adult displays a pair of glistening white wings, which have given it the second half of its scientific name, *Blissus leucopterus*. *Leucopterus* is made up of a pair of Greek words meaning white wing. The young bug has its growing wings packed away in a pair of stubby cases on its back, and is marked with a white band.

The average citizen is more apt to remember the chinch bug by its odor than by its rather insignificant appearance, for it smells most disagreeably when crushed. In this it is true to its tribe, for it belongs to the same general group that includes squash bugs, stink bugs and other malodorous citizens of bugdom.

Unlike many of our most serious insect enemies, the chinch bug is not an immigrant. It is a native-born racketeer, which has always lived in the Southwest. It did not adopt a career of crime, however, until white settlers brought it "easy pickings" in the form of cultivated crops.

There is a second species, the turf chinch bug, which has lately been making

itself a major nuisance on golf courses, especially in New York and surrounding states. Entomologists at Cornell University are now endeavoring to find some

kind of gas attack that will stop its depredations without ruining the fairways and greens.

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#### AGRICULTURAL ECONOMICS

## Partly Empty Grain Bins Hold No Bread for Soldiers

**P**ROMOTE peace by filling your powder bins, is a stock argument of preparedness advocates, made familiar by much repetition.

Less familiar, but conceivably at least as legitimately arguable, is the thesis that the tottering peace of Europe may receive a little added support from this country's partly empty grain-bins.

Dr. James Brown Scott, of the Carnegie Endowment for International Peace, inquired a few days ago, "Without having the United States as the base of hostile operations from which to obtain an ever-increasing supply of arms and ammunition, and indeed foodstuffs, would the World War have lasted as long as it did?" And he pointed out that in a great war the belligerents, their own industrial and agricultural output diminished, always looked to accessible neutral powers as magazines of supplies.

If war should come, it is quite conceivable that that overwhelming public opinion in this country might prevent sales of munitions or metals to the belligerents. But it might be more difficult, ordinarily, to obtain a popular mandate for an export embargo on foodstuffs and other agricultural products.

Right at present, however, even that might be strongly supported, simply because the average citizen has become a bit uneasy about having bread enough for himself. The first spring crop estimate of the U. S. Department of Agriculture indicated a probable harvest of 435,499,000 bushels of winter wheat, with more than an additional 93,699,000 bushels carried over from last year's crop. Since then, new dust storms have been raging, and what they may have done to the standing crop has not yet been determined.

"Adequate supplies for domestic requirements," says a leading agricultural spokesman. But that cheerful estimate significantly omits any allowance for rations to go into somebody else's haversack.

True, some of the European powers,

by the most strenuous kind of artificial encouragement, have boosted their own wheat production to a point of proud self-sufficiency. But let Hans and Jacques and Ivan lay down the scythe for the sword, leaving the womenfolk behind to tend the crop, and this self-sufficiency will soon begin to wear pretty thin.

Other grain areas—Argentina, Australia, India? Perhaps; but when delivery in a hurry has been a factor, the better organized North American facilities have always functioned first.

Moreover, practically all the great extra-European wheatfields, outside the United States, are not to be counted as neutral. They are dominated by Great Britain, either by actual political ties or through economic set-ups. The one great neutral cupboard is Uncle Sam's, and though he fears no famine for himself, he has no spare loaves this year to hand out to disturbers of the peace.

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#### CHEMISTRY

### "Gas Attacks" Improve German-Grown Tobacco

**S**MOKERS are sometimes accused, by wisecracking friends, of conducting gas attacks. Less grounds for this accusation may some day be found in tobacco which has itself been the subject of a gas attack. Experiments pointing in this direction were reported by Dr. G. Pfützer and Dr. H. Losch. (*Die Umschau*, March 10)

Drs. Pfützer and Losch subjected German-grown tobacco to treatment with ethylene and other gases, during various parts of the fermentation or "ripening" process. These gases are the same as those used in the United States to speed the ripe coloration of fruit and the opening of cut flowers. The results, as tested by skilled tobacco judges, were noticeable improvements in both the color and the smoking qualities of the leaves.

*Science News Letter, April 27, 1935*

## ANTHROPOLOGY

**America's Scientists Are Tall, Dark, Deep-Chested**

A "TYPICAL" leading scientist in the United States would be taller and deeper-chested than the average person. He would be dark-haired (or dark, turned to gray) and his head would be larger and proportionately broader than the average American's. Though getting well along in years he would not show any notable signs of senility.

These are among the findings reported to the National Academy of Sciences, on measurements of 150 of its own members made by Dr. Ales Hrdlicka, physical anthropologist of the U. S. National Museum. One hundred of these are men of "Old American" stock, the remaining fifty are European born or of more recent American derivation.

"The membership as a whole represents in every respect a normal group, above the average of the general population," commented Dr. Hrdlicka. "The total of the results indicate that, barring rare exceptions, the membership of the Academy represents not only mentally but also physically a select group."

*Science News Letter, April 27, 1935*

## PHYSICS

**Britain To Build New Non-Magnetic Ship**

BUILT almost wholly without iron or steel, a new non-magnetic ship is planned by Britain to replace the lost "Carnegie" formerly operated as a cruising laboratory by the Carnegie Institution of Washington. The "Carnegie" was destroyed by explosion and fire while refueling in the harbor of Apia, Samoa, Nov. 29, 1929.

A non-magnetic ship has tremendous practical importance as well as great scientific value. The deviation of the compass from true north varies from place to place on the earth, and changes with time. Hence if navigation charts are to be made and kept accurate, exact compass determinations have to be made periodically.

Paradoxically, although compass accuracy is more important at sea than on land, it is easier to achieve on land than at sea. This is because ordinary ships, even wooden ones, contain so much iron that they disturb the delicate instruments and falsify their readings.

Because of this, the Carnegie Institution of Washington built the non-mag-

netic yacht "Carnegie," replacing practically all iron and steel fittings and machinery with bronze and other non-ferrous metals. Even the two internal-combustion engines she carried were almost wholly bronze, the only iron in them being the linings of the cylinders. So small a matter as the iron in the "tin" cans of her stores was a cause of concern to the scientific command.

After the loss of their ship, the Carnegie Institution of Washington decided not to replace her. The British Admiralty, in view of the Empire's great maritime interests, has therefore undertaken the construction of a non-magnetic ship of their own. Parliament has just authorized the expenditure of 10,023 pounds sterling as first installment of her cost. Details of the plans are not yet public, but it is probable that the new ship will be larger than the "Carnegie."

*Science News Letter, April 27, 1935*

## PALEOBOTANY

**Identify Trees Peking Man Used For Firewood**

WHEN PEKING Man—famous today as the earliest known human being of China—chopped wood for his campfire 100,000 years ago, he chose a redbud or Judas-tree.

So, botanists announce to the Geological Society of China 100,000 years later, after training microscopes on remains of the oldest known fire laid by human hands.

To study the plant life of Peking Man's world, Dr. Ralph W. Chaney, paleobotanist of the Carnegie Institution of Washington and professor of paleontology at the University of California, made a trip to China two years ago. In a report now published Dr. Chaney and his associate, Lyman H. Daugherty, say that cross-sections of bits of charred wood from Peking Man's hearth are identified by their structure as a new species of *Cercis*. This tree would be a redbud, akin to modern redbuds that flower with purplish-red blossoms in the spring in America and the Orient.

The redbud that Peking Man knew in the Old Stone Age has been named *Cercis Blackii* in honor of Dr. Davidson Black, who first described the ancient man of China to science.

The new species is enough like a modern Chinese redbud common in Chili Province to suggest to the scientists that the climate of Peking Man's time was temperate, like the climate today.

*Science News Letter, April 27, 1935*

**IN SCIENCE**

## MEDICINE

**Lead Helpful Addition To Treatment of Cancer**

INJECTIONS of a lead compound are helpful in conjunction with surgery in the treatment of cancer, Drs. J. Arnold Bagen, Bayard T. Horton and Arnold E. Osterberg of the Mayo Clinic reported to the American Journal of Cancer.

This does not mean that lead is a cure for cancer. But when the size, extent and situation of the cancer make its complete removal impossible, intravenous injection of lead seems to do something to the body processes that tends toward suppression of the remaining cancer cells, the Mayo Clinic investigators report.

So far they have worked only with far advanced, hopeless cases of cancer. They believe their results justify further experimentation and trial. Two phases of the problem need further investigation. One is the problem of the best way to get lead distributed from the point of injection to the cancer tissue. The other is the question of hindering the growth of a cancer by a substance that affects fundamental body processes known by the scientific term of metabolism.

*Science News Letter, April 27, 1935*

## PHYSIOLOGY

**Vitamin B<sub>4</sub> Found To Fight Anemia**

VITAMIN B<sub>4</sub> apparently can prevent anemia by stimulating formation of red blood cells, Drs. Jean L. Kyer and Frank H. Bethel of the Simpson Memorial Institute, Ann Arbor, Mich., reported to the American Society of Biological Chemists.

The anemia in this case is not pernicious anemia but the kind known as nutritional anemia. Other parts of the vitamin B complex, which is made up of at least four vitamins, were not effective in preventing anemia, experiments with rats showed. Vitamin B<sub>4</sub> may play its important antianemic role by influencing the production of hemoglobin, the coloring matter of blood.

*Science News Letter, April 27, 1935*



# EX FIELDS

## ASTRONOMY

## Results From Total Solar Eclipses Given Academy

**H**OLDING postmortems on total solar eclipses, two astronomers announced new findings about the sun to the National Academy of Sciences.

Dr. S. A. Mitchell of the University of Virginia's Leander McCormick Observatory finds that the elongated coronas or pearly light halos of the sun, supposed to be characteristic of a sun with a minimum of sunspots, occur one and a quarter years before the actual sunspot minimum. The circular corona considered "maximum type" occurs at the same interval before the actual peak of sunspots.

The sun's outer scarlet envelope of tenuous gases, called the chromosphere, was pronounced "a hot-spot phenomenon" by Dr. Donald H. Menzel of Harvard College Observatory, using eclipse spectra photographed by Lick Observatory. He concluded there must be either more ultraviolet radiation than usually assigned to the sun or high-velocity electrons must be ejected from the sun.

*Science News Letter, April 27, 1935*

## MEDICINE

## Human Meningitis Case Due to Filterable Virus

**T**HE FORMIDABLE infectious brain disease, meningitis, can be caused by a filterable virus, one of the still-mysterious class of microorganisms so small that they can pass unchanged through the pores of a fine stone filter.

At the meeting of the National Academy of Sciences, Dr. Thomas M. Rivers of the Rockefeller Institute for Medical Research reported on a case of virus-caused meningitis in two men, observed last winter and under study since then. Dr. Rivers associates in his investigation were Drs. T. F. McNair Scott and M. R. C. P. Lond.

Fluid taken from the patients' spinal cord cavities was first injected into the brains of six white mice. The mice became sick and from them a filterable virus was isolated that is pathogenic for mice, guinea pigs and monkeys.

"This virus is immunologically identical with the one described in 1934 by Armstrong and Lillie as producing experimental lymphatic choriomeningitis in monkeys and mice," Dr. Rivers stated. "It is also immunologically identical with the virus recently isolated by Traub from normal-looking stock mice."

"Many viruses attack the central nervous system of man and lower animals causing an encephalitis, and can be recovered from the brain and cord but not from the spinal fluid. It appears that the new virus with which we are dealing can induce in man an uncomplicated picture of meningitis and can be recovered from the spinal fluid."

*Science News Letter, April 27, 1935*

## AGRICULTURE

## Plows are West's Weapons Against Drifting Soil

**D**UST storms, raging out of the West, are blowing a new word into the national vocabulary: "listing." Or rather, they are bringing this well-established farm word into city speech as well.

We hear of "listing" as an emergency device for checking the drift of loose soil before the destructive wind of the Plains. Listing is a special kind of plowing, done with a plow built to throw earth out of the furrow on both sides. This implement is known as a listing plow, or simply a "lister."

The use of listing to check wind erosion of the soil consists simply of running furrows across the fields at right angles to the direction of the prevailing winds. This means, as a rule, from northeast to southwest, since the prevailing winds of the midcontinental areas are northwesterlies. These furrows, plowed deep, serve as traps for the soil as it begins to drift, hindering it from getting a running start for a leap into the air. The furrows are usually spaced from eight to fifteen feet apart.

Plowing deep offers a double advantage. It makes the furrows last longer as drift-traps, and it exposes coherent cloddy soil which forms firmer little ramparts against the assault of the wind. A ridge of dusty soil would itself be merely an invitation for the wind to take hold and haul it away. Of course, as soon as the furrows have been filled with drift, the field has to be listed again, so the deeper the farmer sets his share in the first place the longer time he gains before he needs to repeat the job.

*Science News Letter, April 27, 1935*

## PHYSIOLOGY

## "Reach For a Sweet" Is Latest Scientific Advice

**T**HE OLD slogan about reaching for a cigarette instead of a sweet may be all right for those who want to lose weight but for those who want to do some heavy thinking, it should be reversed.

Experiments showing that the brain gets its energy for thinking from glucose or sugar were reported to the American Physiological Society by Drs. H. E. Himwich and J. F. Fazikas of Yale University.

The brain takes sugar from the blood, breaks it up into simpler chemical combinations, and burns the lactic acid thus obtained to get energy just as a steam engine gets its energy from burning coal, Dr. Himwich explained.

He and his associate found accidentally that when nicotine is mixed with brain tissue in a flask, the brain cannot burn lactic acid but the burning (oxidation to the chemists) goes on just the same if glucose is present. So it appears that the brain has two ways of getting energy for thinking from glucose or sugar. Ordinarily it gets the energy via lactic acid, but if this is impossible, it gets the energy directly by burning the glucose.

The amount of nicotine that gets to the brain when a cigarette is smoked, however, is probably too small to affect the burning of lactic acid, Dr. Himwich explained. Incidentally, nicotine is not responsible for the increased sugar in the blood caused by tobacco smoking, Dr. Ephraim B. Boldyreff of Battle Creek Sanitarium reported.

*Science News Letter, April 27, 1935*

## EVOLUTION

## Elephant Family Tree Traced 50 Million Years

**F**IFTY million years of elephant family history was the impressive record spread before the meeting of the National Academy of Sciences by Dr. Henry Fairfield Osborn, president emeritus of the American Museum of Natural History in New York City.

There used to be many more kinds of elephants than there are now. Twenty-eight distinct lines of descent were shown on Dr. Osborn's charts, each with its own conformity to basic principles of evolution outlined according to a system of Dr. Osborn's own devising, which he calls "aristogenesis."

*Science News Letter, April 27, 1935*

## ASTRONOMY

# Four Planets Join Spring Stars

## Brightest of These, Venus, Will Be Hidden By Moon's Disk On the Evening of May Fifth

By JAMES STOKLEY

**T**O JOIN the springtime stars this month in the evening sky, come four of the five planets that can ever be seen without a telescope. One, Mercury, will be seen only for a few days around May 26, when it will appear as a bright star low in the west after the sun has set. But the other three, Venus, Mars and Jupiter, will be seen all month through most of the evening. Venus is brightest of all and can be seen in the west as soon as the sky begins to darken, some time before any other star or planet comes into view. It is in the constellation of Gemini, the twins, and as the sky gets darker, Castor and Pollux will appear above it.

Farther north can be seen Capella, in Auriga, the charioteer, and still farther north the W-shaped constellation of Cassiopeia. High in the north appears the great dipper, part of Ursa Major, the great bear; and half way between this group and Cassiopeia is the little bear, Ursa Minor, in which is the little dipper, with the pole star at the end of the handle.

Directly south of the great bear is another animal, Leo, the lion, which can be recognized by the "sickle," to the right, with the blade curving to the west, and Regulus at the bottom of the handle, pointing downwards. A triangle of fainter stars, to the left, forms the flanks of the lion. Farther to the west and lower, appears Procyon, a star in Canis Minor, the lesser dog.

Next to Leo to the east is Virgo, the virgin, and it is in this group that we find another of May's evening planets. Red Mars shines brilliantly, to the right of the star Spica, and above the quadrilateral of stars that mark Corvus, the crow. Towards the southeast can be seen the planet Jupiter, even more brilliant than Mars, though not as bright as Venus. Jupiter is in the group of Libra, the scales, and below this can be seen the first part of Scorpius, the scorpion. The creature's tail is below the horizon until late in the evening.

The maps show the skies as seen at 10 p. m., May 1; 9 p. m., May 15; and 8 p. m., May 30.

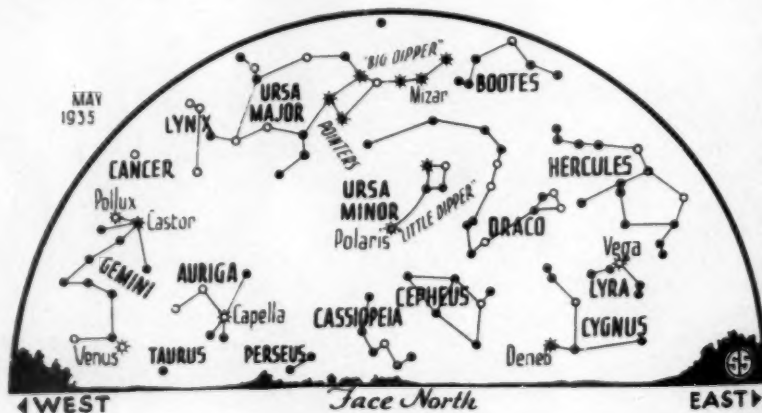
High in the southeastern sky is Arcturus, in the constellation of Boötes. A good way to find this well known star is to imagine the curve of the handle of the great dipper continued to the south. As you follow such an imaginary line you come first to Arcturus, then to Spica. Directly to the north of Boötes can be seen a little semicircle of stars, Corona Borealis, the northern crown, and below this is the large constellation of Hercules. Below Hercules is Lyra, the lyre, with the first magnitude star Vega, brightest star now visible, though considerably fainter than any of the three planets visible in the evening. Below Lyra is Cygnus, the swan, in which is the star Deneb.

The most interesting astronomical events of May are concerned with the moon and two of the planets now in view. When we think of eclipses, we generally think of the kind that happens when the moon passes in front of the sun, or into the shadow of the earth. But the moon is a solid body, and as it travels around through the sky, it frequently comes in front of other bodies besides the sun. Such an event is termed an occultation. Almost any night that the moon is visible, an occultation of some faint star can be seen. Those of stars bright enough to be seen with the naked eye are rarer, especially those of first magnitude stars. It might be thought that the moon is big

enough so that it would frequently hide stars. But the moon's size is deceiving. Ask a person how many full moons they think it would take to fill the sky completely. The chances are that their guess will be far below the correct figure, which is 115,200. But even with the best conditions we can never see with the naked eye more than 2,500 stars in the sky at one time.

If they were uniformly spaced, the areas between the stars would be about 46 (115,200 divided by 2,500) times the area occupied by the moon. Or, if disks the area of the moon were scattered around the sky at random, it would take 46 of them, on the average, to cover a single star. That is why the chances that the moon will hide a single star are so slight. It can move through a considerable part of the sky without covering one.

The month of May, however, brings to most of the country an occultation of a bright star, as well as one of the still rarer occultations of a planet. The latter comes first. On the evening of May 5, at 7:08 p. m., eastern standard time, as seen from Washington, the moon, then a narrow crescent four days after new, will pass in front of the planet Venus. At 7:59 p. m., it will have moved completely across, and the planet will reappear. In other parts of the United States, the times will be slightly different, and farther west it will be increasingly difficult to see, because it will occur before the sun has set. Even there, it may be seen with proper optical aid. Venus is now so bright that it can be easily seen in full daylight even through small telescopes.

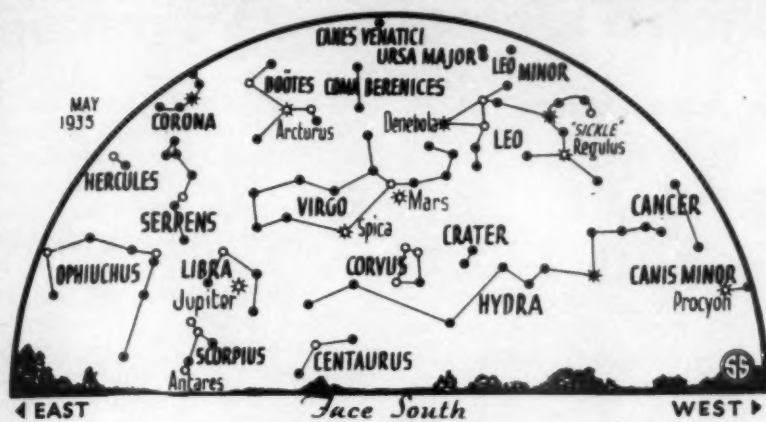


### VENUS HIDES

Watch Venus, low in the western sky in the early evening of May 5, if you wish to see her hide in the embrace of the new crescent moon.



## \* \* \* SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



## HIDES HIS MOONS

If you have a small telescope and live in the eastern states, you may see, on May 8, three of Jupiter's four moons disappear into his brilliance.

The phases of the moon are caused by the fact that as it makes its circuit of the earth every month, we see varying amounts of the sun-illuminated lunar hemisphere. When sun and moon are on opposite sides of the earth, the entire bright half is turned towards us, and we see it full. When between the sun and the earth, the bright half is away from us, we cannot see the moon at all, and it is the time of new moon. The moon travels from west to east among the stars, and a few days after new, it has moved far enough to remain in the western sky a few hours after sunset, and by this time a narrow segment of the sun-lit hemisphere is turned towards us, which we see as a crescent.

Consequently because the moon is travelling eastward when it overtakes Venus on the fifth, the planet, though moving in the same direction, will vanish behind the moon's dark edge. However, the dark side of the moon will probably be faintly visible because of earthshine, sunlight reflected from the earth to the moon and thence back to us. As it takes an appreciable length of time before the moon completely covers the planet, the latter will disappear gradually. This will be especially interesting through a telescope magnifying as much as thirty or forty times enough to show Venus as an appreciable disk, itself in a gibbous phase similar to that of the moon between first quarter and full. The reappearance will also be gradual, but this will be from behind the bright edge and will not be so noticeable. Probably the planet will not be seen with the unaided eye until entirely clear of the moon's disk.

May's second occultation comes on the nineteenth, and will be visible all over the United States, but the people in the East, making up for their favored position on May 5, will have to stay up until the small hours to view it. This is of the star Antares, in the scorpion, which at this time of night is seen well above the horizon to the south, as it is during the evenings of summer. Antares has a brilliant red color. Extending from it to the left is a hooked row of stars, which forms the scorpion's tail. The moon will be very bright, just a day past full. At 3:15 a. m., eastern standard time, from Washington, the star will be covered, and at 4:12 a. m., it will reappear. The star will disappear and reappear suddenly, instead of emerging gradually as did Venus. This happens because the star, even through a powerful telescope, has no appreciable disk, but appears as a point of light. As soon as it comes out at all, it is entirely visible. There is no atmosphere around the moon to produce absorption and to cause the star to appear slowly. In fact, this immediate disappearance and return of stars at occultations afford the very best proof that the moon has no layer of air surrounding it.

For those equipped with small telescopes in the eastern states, another interesting event during May will happen on the evening of May 8, in connection with Jupiter. With only a small instrument, the four large moons of this planet, which has nine altogether, can easily be seen. Sometimes one of the four will disappear behind Jupiter, or into its shadow, or else it may vanish as it passes directly in front of the planet, because they are of so nearly the same color.

Almost every night something of this kind can be observed, but on the evening of the eighth, three of the four will be gone at once. From 8:55 to 10:20 p. m., eastern standard time, only satellite number 4 will remain in view, to the west of the planet. In the western parts of the country, Jupiter will not have risen until 10:20 p. m., eastern standard time, and so they will miss this unusual sight.

Our moon is new on the second, at first quarter on May 10, full on the eighteenth and at last quarter on the twenty-fifth. On May 11, at 9:15 a. m., eastern standard time, it will be farthest from the earth, with 251,200 miles separating us. This is called apogee. Perigee, when the moon is closest the earth, happens on the twenty-fifth, at 11:30 a. m., and then we shall be only 229,650 miles away.

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## EUGENICS

## Sterilization Is Urged To Prevent Blindness

STERILIZATION was urged as a measure to prevent blindness at the meeting of the International Association for Prevention of Blindness.

For this purpose facilities should be made available everywhere for sterilization of persons suffering from hereditary eye diseases and pre-marital certificates regarding the freedom from such diseases should be required of brides and grooms, Dr. A. Franeschetti of Geneva, Switzerland, declared.

The chances of becoming blind are greatest in the first two years of life, Dr. M. Van Duyse of Ghent, Belgium, told members of the conference. The conditions responsible for the high proportion of blindness in the early years of life are babies' sore eyes, scientifically known as *ophthalmia neonatorum*, and injuries or sores of the cornea.

Cases of blindness from babies' sore eyes have been reduced 75 per cent. in the United States during the past 25 years, Lewis H. Carris of New York, managing director of the American National Society for the Prevention of Blindness, reported. This reduction has come about, Mr. Carris explained, as a result of state laws requiring physicians and midwives to wash the eyes of every new baby with a prophylactic solution.

Dr. Park Lewis, of Buffalo, N. Y., presided at the international conference in the absence, due to illness, of the president, Prof. F. de Lapersonne of Paris.

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PHYSICS

# Sequel to a Scientific Detective Adventure

## Clue to Heavy Hydrogen's Discovery Proves Wrong But Hidden Twin Was Found Just the Same

By WATSON DAVIS

**I**N ADVENTURES of police and detectives, it sometimes happens that a false clue leads to the guilty person.

Science has a parallel case, for the clue that started the successful search for heavy-weight or mass two hydrogen (deuterium as this twin to ordinary hydrogen is now called) is now shown to be not in accord with the latest facts and figures.

This scientific detective story can be picked up when Dr. Raymond T. Birge and Dr. Donald H. Menzel, computing the relationships of weights of atoms, came to the conclusion in 1931 that there existed an undiscovered hydrogen twin, twice the weight of ordinary hydrogen, existing in nature with an abundance of about one in 4,500 hydrogen atoms.

It is history that the research trio of Prof. Harold C. Urey, Dr. F. G. Brickwedde, and Dr. G. M. Murphy of Columbia University and the National Bureau of Standards discovered deuterium in 1931, and that the 1934 Nobel prize for chemistry to Prof. Urey crowned the achievement. Such a burst of research as science has seldom seen followed the discovery. It was the first good chance to see how varieties of the same element, isotopes they are called, differed from each other. Heavy water, a strange kind of  $H_2O$  in which all or most of the hydrogen was the heavy variety, was made and used in experiments.

### New Determination

Now four years after, there comes from England a new determination of the atomic weight of hydrogen which was used by Drs. Birge and Menzel in the computations that gave the original clue to deuterium.

Experimenters in Cavendish Laboratory, Cambridge, measuring and interpreting the range of the particles flung off by artificially radioactive atoms, politely suggested that Dr. F. W. Aston erred by one part in 4000 when in 1926 he determined the ratio of the weights of the helium and oxygen atoms, a determination that led to the weight of 1.0078 for hydrogen. The new weight suggested

is 1.0081, and Dr. Aston, making new observations with an improved mass spectrograph, confirmed this value.

If Drs. Birge and Menzel had used this atomic weight there would not have resulted the discrepancy in figures that resulted in deuterium's discovery.

No more complex than the evidence in many detective stories are the scientific details of the "Hydrogen Case" or "Found Through a False Clue." Dr. Raymond T. Birge of the University of California, who makes critical studies of physical constants, has assembled for *Science Service* a record of this interesting case.

### Oxygen the Basis

Oxygen is the basis for all atomic weights, Dr. Birge explains, and since we now know that oxygen has isotopes, one must say that the atomic weight of the average mixture of oxygen isotopes is taken as exactly 16 by definition. The great majority of atomic weights are determined by direct comparison with silver. For that reason particular effort has been made to determine, as accurately as possible, the silver-oxygen ratio. The present accepted atomic weight of silver is 107.880, and since exactly this figure has been obtained in several quite independent ways, it is believed to be correct to one part in 100,000. This is by far the most accurately known atomic weight. On the other hand, because of the importance of hydrogen, a special effort has been made to obtain its atomic weight with accuracy, and the value adopted in Dr. Birge's reports on general constants, etc., is 1.00777. These atomic weights are all on what can be called the chemical scale.

There is now an entirely independent scale of atomic weights, generally called the physical scale and based on the assumption that the mass of the mass sixteen isotope is exactly 16 by definition. All masses on this scale are determined by the mass spectrograph, or now, more recently, by the disintegration work at Cambridge University. Aston found 1.0078 for the mass of hydrogen. More recently Bainbridge found 1.00778. Now if neither hydrogen nor oxygen had iso-

topes, the chemical value just given should agree exactly with the mass spectrograph value. As soon, however, as the oxygen isotopes were discovered, this brought about, necessarily, a predicted discrepancy in the two results for hydrogen.

### Prediction Made

On the basis of this discrepancy, Drs. Birge and Menzel predicted (*Physical Review*, 37, 1669, 1931) that there should exist an isotope of hydrogen of mass 2 with a relative abundance of one part in 4500. This was based on the assumption that the abundance of the oxygen isotopes was such as to require a reduction of 2.2 parts per 10,000 in reducing from the physical to the chemical scale. More recent work on the abundance of the oxygen isotopes indicate that the true correction factor is more nearly 2.5 per 10,000. As a result of this prediction a number of persons immediately began active work for this isotope, and Dr. Urey was fortunate enough to be the first one to find it. Moreover, he found it with an abundance of one part in 4000, almost exactly that predicted by Drs. Birge and Menzel.

### A Good Check

The best work on this subject by Bleakney, gives one part in 5000 for the abundance. This, in itself, indicates a very good check. In other words, one would conclude that the relative abundance of the oxygen isotopes, and of the hydrogen isotopes, just cancelled in such a way that the observed mass of mass one hydrogen on the physical scale should be practically equal to the observed atomic weight of the mixture of the hydrogen isotopes in the chemical scale, the value in both cases being practically 1.0078. Unfortunately, the agreement is quite deceptive, for it has been pointed out by Dr. Urey, and others, that the best determinations of the atomic weight of hydrogen have been made with electrolytic hydrogen, and in this, as is well known, the abundance of the heavy isotope is very much less than normal. In fact it is probably not more than one part in 40,000, or one in 30,000, at the most. Hence the discrepancy, on the basis of which Drs. Birge and Menzel made their prediction, apparently is not explained by the facts.

Now, however, the Cavendish experi-



menters have found that both Aston and Bainbridge are wrong in the value of the mass of the mass one hydrogen isotope on the physical scale. It should be 1.0081 in place of 1.0078. Assume, for the sake of argument, that this new figure is correct. On reducing it to the chemical scale, we then get 1.00785 as the predicted value of mass one hydrogen. If there is an abundance of one part in 30,000 in the experiments made on the atomic weight of hydrogen, then, for this mixture, the atomic weight should have a value, on the chemical scale, of 1.00788 in order to agree with the new Cavendish value. This value of 1.00788 agrees very well with the observed chemical value of 1.00777 previously quoted. Hence the Cavendish work practically clears up the discrepancy between the atomic weight of hydrogen and the mass spectrophotograph values. For the first time, it gives independent evidence of the essential correctness of the present accepted atomic weight of hydrogen, and clears up a serious discrepancy of several years' standing.

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## PHYSICS

## New Atom Weighings Show Masses Need Corrections

**N**EW weighings of the atoms just completed at Cambridge, England, by Dr. F. W. Aston, Nobel and authority on atomic weight, give confirmation of the announcement made to the Royal Society about a fortnight ago by Lord Rutherford and his colleagues that some of the weights of common elements need revision. (*SNL*, March 23, p. 180)

Using a partially completed mass spectrophotograph or atom weigher, Dr. Aston announces in a letter to *Nature*, the following masses: For hydrogen, 1.0081; for deuterium or hydrogen of mass two, 2.0148; for helium, 4.0041; for carbon, 12.0048.

The famous Aston value for light-weight hydrogen determined by him in 1926 was 1.0078, contrasted with the new value of 1.0081.

### Inaccurate Standard

What has happened now is as though the official pound weight of a nation were found to be slightly inaccurate. The weights of atoms are referred to the weight of oxygen taken as 16, either as it occurs on the average in nature or as the lightest of the three varieties, depending upon whether the determination

is by chemical or physical methods.

The team of Cavendish Laboratory researchers, Prof. M. L. E. Oliphant, A. E. Kempton and Lord Rutherford, first suggested the need of revision as a result of the energies with which bombarded atoms artificially disintegrated. The distances the atom particles shoot out from the exploding atoms allow calculations of the masses of the atoms.

Dr. Aston admits that these disintegration experiments as atom weighers are "much more delicate but less direct." Dr. Aston's new atomic weights are as yet provisional and in no case does he claim greater accuracy than one in 10,000.

Scientists are interested in the slight differences in atomic weights discovered because they are of large importance in computing the energy within atoms and developing theories as to the existence of isotopes or varieties of atoms.

"I am never likely to regret the underestimate of hydrogen's atomic weight that I made in 1926," Dr. Aston said, "however serious it may ultimately turn out to be, because of the fundamental part it played in encouraging the search for heavy weight hydrogen (called deuterium) which was discovered in America."

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## PHYSICS

## Einstein Proved Right Again By Light From Hottest Stars

**E**INSTEIN is again proved right, this time by light from the universe's hottest, most luminous and most massive stars, observed by Dr. Robert J. Trumpler of the University of California's Lick Observatory, on Mt. Hamilton, Calif., who told the National Academy of Sciences about it at its opening meeting.

One of the three famous tests of Einstein's general theory of relativity was proof of what astronomers call "red-shift," which means that a large mass like the sun or another star pulls back on the light energy it radiates and increases its wavelength. The famous heavy-weight dwarf star companion of brilliant Sirius, whose matter is 4000 times as dense as on earth, showed this predicted effect in observations at Mt. Wilson and Lick Observatories about a decade ago, but later observations indicated that this heavy-weight bantam star may be brighter in light than suspected and also that it may



### SAVER OF GOLD

Corduroy similar to that used in a lady's lounging pajamas or a boy's school knickerbockers, but having wider cords, is used to entrap gold from the gold ore "pulp" stream which is caused to flow over it. The photograph, showing an enlarged vertical section of the corduroy is used through courtesy of Engineering and Mining Journal.

be twins. Some felt this spoiled its support of Einstein.

Dr. Trumpler searched for and found the Einstein shift effect in light from what are called the class O stars in the great star clusters of our Milky Way.

The astronomer's study is complicated by the fact that stars often rush away from or toward the earth at such tremendous speeds that this also changes wavelengths, a phenomenon called the Doppler shift. Dr. Trumpler got around this difficulty by comparing small and large stars of the same cluster so that their motions could be ignored.

The class O stars showed such greater redshifts of their light that Dr. Trumpler is confident that they uphold relativity. Using the theoretical value of the relation of red-shift to mass, he then used the red-shift to determine that the hot and luminous class O stars are on the average 180 times as massive as the sun.

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## PHYSIOLOGY

## Yogic Breathing Exercises Change Body Processes Little

**B**REATHING in special rhythms, as practised by the Yoga cult of India as a preliminary to thought concentration, has relatively little effect on the bodily processes, Drs. Walter R. Miles and K. T. Behanan of Yale University told members of the National Academy of Sciences at their annual meeting here today.

In the Yogic breathing exercises, several "patterns" are followed. In some, the breathing is relatively light and rapid; in others, very deep, and as slow as only once a minute. Some of the exercises change from one pattern to another.

Dr. Behanan, who is a young Hindu, followed a Yogic regimen for two years, while physiological measurements were made on his bodily processes. It was

found that during the breathing exercises, lasting from ten to thirty minutes, the metabolism or physiological life-speed was increased considerably. The effect, however, was transitory.

"In the case of Bastrika pattern where shallow and deep breathing are alternated within each minute, the after effect is more definitely prolonged and is in the direction of a reduced metabolism," the two investigators reported. "No reliable difference in oxygen consumption is found between experiments on mental concentration and normal quiet periods. The study suggests that artificial breathing patterns, if they influence mental concentration, do so probably more in psychological than in physiological terms."

*Science News Letter, April 27, 1935*

## MEDICINE

## Find Drug That Sobers Up Dogs in Half the Usual Time

**A** DRUG that will sober-up intoxicated dogs in less than half the time it took their fellow drunks to recover from an alcohol jag was reported by Prof. R. N. Harger and H. R. Hulpieu of the University of Indiana School of Medicine at the meeting of the American Society for Pharmacology and Experimental Therapeutics.

The drug is a yellow powder known to chemists as dinitrophenol. It has recently been used to cause fat people to lose weight. Because it is very dangerous when used without a physician's supervision, the Indiana scientists particularly warn the public not to use it as a home remedy after a spree.

"Severe poisonings and several deaths have resulted from its rather widespread use by overweight people," Prof. Harger said.

"We wish to emphasize that our experiments were done only with dogs and that the presentation at this time is solely for its scientific interest. Until further carefully supervised work is done this

drug should not be used in treating intoxication in human beings.

"Otherwise, when 'hubby' returns home 'soused' at four a. m. and takes a capsule of this drug in order to be sober when he goes to the office at nine, he might accomplish the desired result, but again he might go to the undertaker instead."

So dangerous do Prof. Harger and his associates consider this drug that they have hesitated to publish their discovery of its sobering-up effects for fear that some unscrupulous medicine manufacturer might exploit the drug as a treatment for drunkenness and thereby produce cases of serious poisoning or even death.

Their experiments showed that the drug enabled the dogs to burn the alcohol they had been given much more rapidly than the usual rate. While the drug produced some fever in the dogs, which caused them to breathe more rapidly, very little of the loss of alcohol was by way of the lungs.

Other investigators have shown that

the body can burn alcohol only at a fixed rate and that exercise, exposure to cold and similar conditions will not speed up the burning of alcohol by the body. The discovery of the Indiana investigators is the first example of any procedure which will speed up the handling of alcohol by the body. They also investigated the effects of other drugs on the body's handling of alcohol. Insulin, employed in diabetes, and thyroxin, which is effective in reducing fat people, have no effect on the rate of burning of alcohol. Another drug, dinitrocresol, was also found to be effective in speeding up the sobering-up process in dogs.

A recent report from Sweden, Prof. Harger pointed out, indicates that Dr. E. M. P. Widmark of the University of Lund has independently discovered the sobering-up action of dinitrophenol.

*Science News Letter, April 27, 1935*

## METEOROLOGY

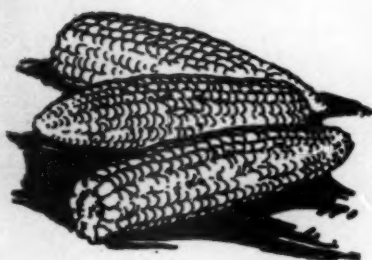
## Rains in Southwest Give Hope for Future

**E**ASTER gifts of rain, last week-end, laying dust and easing drought conditions in the Texas panhandle and across Oklahoma, are hopefully regarded by crop-weather watchers of the U. S. Weather Bureau at Washington, D. C. as possible foretastes of like favors yet to come. The season's rainfall, even in normal years, does not begin in the southern and central Plains area until late April or May. Drought is an expected, normal late-winter condition in that region; it is only because drought this winter has followed three abnormally dry summers that dust storms arose this spring.

The rain-bringing storm welcomed by New Mexico, Texas and Oklahoma, on Good Friday and Holy Saturday brought its moisture from the Gulf of Mexico. Practically all summer rains in the West originate in this way, Weather Bureau meteorologists explained. The first one that comes may not penetrate very far over the land before it empties itself of water. The next one may carry its drive farther, until finally the southwestern "lows" the making their effects felt well out into the Prairies. For this reason, Weather Bureau scientists are hopeful that the next invading "low" may get far enough inland to water the desolate drought area in western Kansas and eastern Colorado, which last week's rain did not reach.

*Science News Letter, April 27, 1935*





### Agricultural Aristocracy

**C**ROP increase rather than crop limitation is the accepted normal function of the U. S. Department of Agriculture. Spokesmen from Secretary Wallace down have explained and re-explained the economic situation that necessitated the clamor-arousing "plowing under" programs, which last summer's drought has already made it possible and even desirable to modify.

Now comes a new move, planned directly for the day when growing two ears of corn where one grew before will again be an undiluted act of rural virtue. A world-wide survey of breeding stocks of all kinds of crop plants and farm animals is being undertaken by the Department, to make available to breeders all over the country the information they need for the more efficient conduct of their researches.

The list of wheats for better bread, of beeves for better meat, of grapes for better wine, and a thousand other growing things will form a Register of First Farm Families, a Mendelian Almanach de Gotha of grass-roots nobility.

As kings used to send afar to get the right daughters to marry their sons, so a potato breeder at the Idaho Experiment Station can send to Maine or Wisconsin for the right mate for his best vines, or a cattle geneticist in Texas can seek in Iowa the most advantageous alliance for his animals. We democrats may insist still upon hit-or-miss romances for our own personal lives, but for our servants on roots or hooves we will have none but marriages of convenience.

Plant and animal breeding has already gone far in this country. It has produced better quality, quicker maturity, heavier yield, resistance to disease and

drought, and a hundred other desirable qualities in a thousand plants and animals. So numerous have our First Farm Families become that in their present scattered states even specialists often do not know about the very thing they most need, if it is in the hands of another

specialist in a remote part of the country. We have half a hundred flourishing kingdoms of farm aristocrats and there are many others in friendly foreign lands; Secretary Wallace has moved to weld them into an empire.

*Science News Letter, April 27, 1935*

### PHYSIOLOGY

## Stimulus to Hearing Is Chemical, Not Electrical

**E**VIDENCE that the stimulus to the nerve of hearing is chemical and not electrical was presented by Drs. A. J. Derbyshire and H. Davis of Harvard Medical School at the meeting of the American Physiological Society.

Originally these scientists thought that the electrical changes developed by the sensory cells in the ear when sound waves reach them were the agents that stimulated the nerve of hearing to carry the impression of sound to the brain. The experiments they reported have convinced them that it is much more probable that the sensory cells set free a chemical substance which in turn stimulates the fibers of the hearing nerve.

They examined the electrical phenomena which are produced in the ear by the sound of a click. This stimulus produces two well-known responses, they found. One is developed by the sensory cells in the ear when they are subjected to the mechanical pressure of a sound wave. The other is the electrical change associated with the nerve impulses in the auditory or hearing nerve. They found that this impulse in the auditory nerve travels at the rate of about 60 miles an hour.

Even after accounting for the time for the impulse to travel along the auditory nerve, however, they found a delay of 5 ten-thousandths of a second between the response of the sensory cell and the start of the impulse along the nerve. This delay could not be explained by their first theory of stimulation by the electrical response of the sensory cell.

The frequency at which a nerve fiber can carry impulses explains why a loud noise occurring while music is being played interferes with the hearing of the fainter musical notes.

A nerve fiber cannot carry a second nerve impulse within an interval of about a thousandth of a second following a previous impulse, Drs. Davis and Derby-

shire found. This "refractory period" explains the mechanism of auditory masking, they said.

They investigated the electrical activity of the ear and of the hearing or auditory nerve of the cat when the ear is stimulated by two sounds simultaneously such as musical tones and sharp clicks. Just as the click would interfere with hearing of the fainter musical tones, the electrical disturbances which signal the passage of nerve impulses in the ear of the cat show masking of one sound by the other.

If the click falls immediately after the sound wave of the musical tone it will be masked. If it falls just a trifle earlier, the click will set up nerve impulses and be heard and one wave of the musical tone will be lost.

"But if the two sounds compete in this way for the same nerve fibers, one or the other will be masked to a certain extent, depending on which one succeeds in first exciting the nerve fiber.

"In the sense organ of the inner ear, there is no evidence of any such masking," they reported. Both sets of sound waves are represented simultaneously in the activity of the sensory cells, just as they are carried through the air as complex sound waves.

*Science News Letter, April 27, 1935*

## ● RADIO

*Tuesday, April 30, 3:30 p. m., E. S. T.*

**PLANNING FOR WATER RESOURCES DEVELOPMENT**, by Prof. Thorndike Saville, Professor of Hydraulic and Sanitary Engineering, New York University.

*Tuesday, May 7, 3:30 p. m. E. S. T.*

**THE ROMANCE OF MODERN EXPLORATION**, by Dr. Ansell Hall, Chief, Division of Field Education, National Park Service.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.

# •First Glances at New Books

## Chemistry

**ORTHOHYDROGEN, PARAHYDROGEN AND HEAVY HYDROGEN**—Adalbert Farkas—*Cambridge Univ. Press*, \$3.50. This is the first book on the heavy hydrogen isotope and is thus a pioneer in a field where scores of other books will follow. To chemists and physicists it is sufficient to say that the book is one of the Cambridge Series on Physical Chemistry which stands for accuracy and completeness. But to biologists and others who have to know something about heavy hydrogen since heavy water has physiological effects it may be said that the volume is an essential reference book. Footnotes and a full bibliography enhance its value. Reference to 295 papers in the field are given.

*Science News Letter*, April 27, 1935

## Geography

**THE GEOGRAPHIC PATTERN OF MANKIND**—John E. Pomfret—*Appleton*, 428 p., \$4.00. The realization has been growing recently, in the minds of many scholars, that what men do is conditioned to a great extent by large environmental factors. Hence we see the field of economic and human geography invaded by others besides geographers and anthropologists. The present essay is by a historian.

*Science News Letter*, April 27, 1935

## Physiology

**PACEMAKERS IN RELATION TO ASPECTS OF BEHAVIOR**—Hudson Hoagland—*Macmillan*, 138 p., \$3. The author's thesis is built around substances which he calls "pacemakers": "The point of view which we wish to stress is that much of the overt behavior of organisms is determined by the interrelations of chemical events within cells and groups of cells, quite independently of external environmental factors. This effect is especially shown by rhythmic spontaneous cycles of activity of organs and of the organism as a whole."

*Science News Letter*, April 27, 1935

## City Planning

**MODEL LAWS FOR PLANNING CITIES, COUNTIES, AND STATES, INCLUDING ZONING, SUBDIVISION REGULATION, AND PROTECTION OF OFFICIAL MAP.**—Edward M. Bassett, Frank B. Williams, Alfred Bettman, and Robert Whitten.—*Harvard University Press*, 137 p., \$2.50. The unrestrained individualism that has

made such messes of many of our nineteenth-century settlements has by practically unanimous consent given way to a common will toward decent order. This new evolution in our social consciousness has now progressed so far that even plans may be planned, and models set up for models, as is done quite successfully in this book.

*Science News Letter*, April 27, 1935

## Mineralogy

**GETTING ACQUAINTED WITH MINERALS**—George Letchworth English—*Mineralogical Pub. Co.*, 324 p., \$2.50. Mr. English has performed a real service both to beginning students in mineralogy and geology and to the thousands of people of all ages who are pursuing the fascinating hobby of mineral collection and identification. His book is written in the simplest and clearest kind of language, assuming no previous knowledge of either geology or geometry, and the illustrations are well chosen with an eye to making the text descriptions and explanations even clearer.

*Science News Letter*, April 27, 1935

## Microbiology

**THE SMALLEST LIVING THINGS**—Gary N. Calkins—*University Society*, 135 p., \$1 cloth, 65c paper. A combination essay on bacteriology and protistology, styled for the general reader by a veteran leader in protozoological research. There are many well-chosen illustrations.

*Science News Letter*, April 27, 1935

## Engineering

**TRANSACTIONS, IRON AND STEEL DIVISION, 1934**—*American Institute of Mining and Metallurgical Engineers*, 299 p., \$5.00.

*Science News Letter*, April 27, 1935

## General Science

**SCIENCE STORIES, BOOK II**—W. L. Beauchamp, Harriet M. Fogg, Gertrude Crampton and W. S. Gray—*Scott, Foresman*, 176 p., 68c. A good book for very young readers just getting acquainted with the world they live in. The illustrations (at least one to every page) are in lively color.

*Science News Letter*, April 27, 1935

## Esthetics

**CONCERNING BEAUTY**—Frank Jewett Mather—*Princeton Univ.*, 302 p., \$3. For over forty years, Princeton's emeritus professor of art and archaeology tells his readers, he has refrained from writing this "new and perhaps superfluous book on esthetics." Readers willing to think their way through a subject with a teacher who is scholarly in the finest meaning of the word will be glad that Prof. Mather has decided to put his ideas on the experience of beauty into this permanent form.

*Science News Letter*, April 27, 1935

## Gems

**THE STORY OF DIAMONDS**—A. C. Austin and Marion Mercer—*Chicago Jewelers' Association*, 96 p., 50c. paper, \$1 cloth. A brief account of the mining and handling of diamonds, with historical notes on some of the world's famous stones.

*Science News Letter*, April 27, 1935

## Chemistry

**HENLEY'S TWENTIETH CENTURY BOOK OF FORMULAS, PROCESSES AND TRADE SECRETS**—Gardner D. Hiscox, ed.—N. W. Henley, 809 p., \$4. For many years Henley's has been a standby of the household handy man, the artisan in his workshop, the technician in his laboratory. Each new edition adds some new tested processes or formulae so that the book has grown into a compendium of practical chemistry and physics as venerable as the books of the alchemists, and as up-to-date as ultraviolet irradiation.

*Science News Letter*, April 27, 1935

## Engineering-Biography

**SCIENTIFIC PAPERS AND ADDRESSES OF THE HON. SIR CHARLES PARSONS**—Hon. G. L. Parsons, ed.—*Cambridge Univ. Press*, 260 p., \$4.50. Twenty papers on the steam turbine and miscellaneous papers on artificial diamonds and other incidental researches are presented with biographical notes and complete bibliography. It is an important document in the history of engineering as well as a useful memorial to a great man.

*Science News Letter*, April 27, 1935

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